

ILLINOIS COMMERCE COMMISSION

ICC DOCKET NO. 07-0539

DIRECT TESTIMONY

OF

VAL R. JENSEN

Submitted on behalf

Of

CENTRAL ILLINOIS LIGHT COMPANY
d/b/a AmerenCILCO

CENTRAL ILLINOIS PUBLIC SERVICE COMPANY
d/b/a AmerenCIPS,

ILLINOIS POWER COMPANY
d/b/a AmerenIP and

(The Ameren Illinois Utilities)

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VAL R. JENSEN

Submitted On Behalf

of

**ILLINOIS POWER COMPANY
d/b/a AMERENIP**

I. INTRODUCTION AND PURPOSE

A. Identification of Witness

Q. Please state your name and business address.

A. My name is Val Jensen, and my business address is 394 Pacific, San Francisco, California 94111.

Q. By whom are you employed and in what capacity?

A. I am a Senior Vice President with ICF International, a management, technology and policy consulting firm.

B. Purposes of Testimony

Q. What are the purposes of your Direct Testimony?

A. The purposes of my Direct Testimony are to:

(1) Describe how the energy efficiency measures and programs set forth in the energy efficiency portfolio submitted by the Ameren Illinois Utilities (or “the Companies”) were identified.

(2) Show that the Ameren Illinois Utilities' proposed portfolio of energy efficiency programs, when considered in conjunction with the Department of Commerce and Economic Opportunity's ("DCEO") portfolio of such programs, is designed to achieve the goals set forth in Section 12-103(b) of the Public Utilities Act ("Act").

(3) Demonstrate that the individual energy efficiency measures, the overall portfolio of energy efficiency programs, the proposed demand response programs, and the programs in DCEO's portfolio are all cost-effective under the total resource cost ("TRC") test.

(4) Discuss the appropriateness of deeming certain values for the purposes of measurement and valuation ("M&V").

(5) Demonstrate that the Ameren Illinois Utilities' Energy Efficiency and Demand Response plan (the "Plan") is designed to fall within the spend cap described in the Act.

(6) Show that the Ameren Illinois Utilities' overall portfolio of energy efficiency and demand response measures, when considered in conjunction with DCEO's portfolio of such measures, represent a diverse cross-section of opportunities for customers of all rate classes to participate in the programs.

C. Summary of Conclusions

Q. Please summarize the conclusions of your Direct Testimony.

A. I have concluded the following. First, based on a broad assessment of energy efficiency measures and programs, including a review of the experience of utilities in other states in implementing similar programs, and review of the programs proposed by the DCEO, I conclude that the Ameren Illinois Utilities' portfolio of energy efficiency programs is

designed to achieve the goals set forth in the Act. Second, based on my analysis, the programs proposed for the Companies' energy efficiency portfolio satisfy the TRC test, as does the Plan as a whole. Third, the Plan is designed to fall within the spend cap described in the Act. Finally, the Plan offers a variety of options for all customer classes to participate in energy efficiency and demand response programs.

D. Identification of Exhibits

Q. What attachments are attached to and incorporated in your Direct Testimony?

A. Ameren Ex. 3.1: Curriculum Vitae of Val R. Jensen.

E. Background and Experience

Q. Please summarize your duties and responsibilities in your current position.

A. My principal focus at ICF International is the analysis, design and implementation of energy efficiency programs.

Q. Please summarize your educational background and professional experience.

A. I received a B.A. in political science from Hamline University in St. Paul, Minnesota and an M.A. in Public Affairs from the Humphrey Institute at the University of Minnesota where I specialized in Energy Policy and Quantitative Methods.

Prior to rejoining ICF International in 2000, I was Director of the Chicago Regional office for the U.S. Department of Energy's ("DOE") Office of Energy Efficiency and Renewable Energy. In that position I was responsible for the administration of all of the DOE's energy efficiency and renewable energy deployment programs for the Midwest. Prior to assuming that position, I was a member of the senior staff of the Assistant Secretary for Energy Efficiency and Renewable Energy at the DOE in Washington, D.C., with responsibility for assessing policies and programs at the state and federal levels affecting investment in energy efficiency and renewable energy in a

71 restructuring utility market. I also directed the DOE's integrated resource planning
72 program.

73 Before joining the DOE, I spent several years consulting to the U.S.
74 Environmental Protection Agency and a variety of private utility clients with respect to
75 development and implementation of energy conservation programs. I also spent eleven
76 years working for the Illinois Department of Energy and Natural Resources, performing
77 and directing analyses of energy policy and energy conservation programs. For
78 approximately six of those years, I directed the design and development of statewide
79 integrated utility resource plans then required by Illinois law. These plans included
80 assessment of energy conservation potential and were subject to review and approval by
81 the Illinois Commerce Commission. I have testified before the Commission and the
82 Public Service Commission of Wisconsin, as well as before legislative committees in
83 Illinois and Wisconsin.

84 **II. DEVELOPMENT OF A COST-EFFECTIVE ENERGY EFFICIENCY**
85 **PORTFOLIO**

86 **Q. What was ICF's role in assisting the Ameren Illinois Utilities in the development of**
87 **their Energy Efficiency and Demand Response plan?**

88 **A.** The Ameren Illinois Utilities retained ICF to provide support in the development of the
89 plan, including the cost-effectiveness analysis of energy efficiency and demand response
90 measures and programs, and the development of initial program designs. In addition, we
91 were asked to support the Companies in the final development and analysis of the entire
92 portfolio. At the Companies' direction, ICF provided an initial list of energy efficiency
93 measures that could be considered in the analysis. We then developed required data for
94 each measure. I describe this process in greater detail below. As part of this data

collection process, it is typical to prepare building energy simulations to estimate the energy savings associated with energy efficiency measures, where those savings are affected by temperature. A given measure, such as an air conditioner, also depends on the type of building it is used in, and so we typically prepare these building energy simulations for a range of generic building types that reflect the building stock with a utility's territory. The Ameren Illinois Utilities reviewed the building types we suggested. Based on the measure data that we collected or produced using building simulation, we prepared the analysis of measure cost-effectiveness described below. The Companies reviewed the results of this in detail and helped refine inputs and calculations.

With respect to other elements of the process described below, ICF generally undertook each step and then reviewed the results in detail with the Companies. In particular, we worked closely with the Companies in the process of bundling measures into programs and designing the basic elements of each program. The Ameren Illinois Utilities made final decisions with respect to program design, including general incentive levels, program implementation costs and participation rates based on an iterative process of program data refinement and cost-effectiveness analysis.

A. Selection of Energy Efficiency Measures

1. Identification of Potential Energy Efficiency Measures

Q. What is an energy efficiency measure?

A. An energy efficiency measure is a device, appliance or practice which, when installed in a home business or manufacturing process, results in a reduction in the amount of energy used per unit of useful service. A compact fluorescent light bulb is a common example of an efficiency measure when it is used to replace a standard incandescent light bulb.

120 **Q. How does a “measure” differ from the “programs” you refer to above?**

121 A. A “program” is a combination of one or more energy efficiency or demand response
122 measures with a set of incentives or other services and a process for recruiting customers
123 to install or implement the energy efficiency or demand response measures. One simple
124 example of a program is a commercial and industrial prescriptive incentive program,
125 wherein a utility provides fixed incentives for a wide variety of standard commercial and
126 industrial energy efficiency measures. Within such a program structure, the utility often
127 will work with trade allies such as lighting or HVAC contractors to recruit customers
128 who would benefit from installing these measures.

129 **Q. How did ICF select the energy efficiency measures for the initial list?**

130 A. The broad list of energy efficiency measures that might be considered for adoption by
131 consumers in the Ameren Illinois Utilities’ service territory was compiled from several
132 sources, the principal of which was the Database for Energy Efficiency Resources
133 (DEER) maintained by the California Energy Commission. This database contains
134 several hundred unique measures that could be applied in residential, commercial and
135 industrial buildings. When each of these measures is considered in its multiple
136 applications, the list of measures included in the database is in the thousands. For each
137 measure, the database provides an estimate of the energy savings per unit, as well as the
138 costs associated with installation of the measures. All investor-owned utilities in
139 California use this database as the primary source of measure information in the design
140 and evaluation of energy efficiency programs in that state. This database is used by other
141 utilities and state agencies as well. Other sources of information for the measure list
142 included the Consortium for Energy Efficiency, the American Council for an Energy

Efficient Economy (ACEEE), the U.S. EPA Energy Star Program and our own research. The Consortium for Energy Efficiency is a not-for-profit organization funded by utilities and the federal government to develop various initiatives to promote energy efficiency measures. ACEEE is also a not-for-profit organization that has promoted policies favoring energy efficiency for several decades. ACEEE publishes a variety of research reports pertaining to energy efficiency technologies, potential and program best practices.

The final database prepared for this analysis included approximately 1,000 measures. Note that many of these measures are combinations or variations of basic measures, such as different wattages of compact fluorescent light bulbs or different configurations of what are known as T8 linear fluorescent lamps. Also, a number of specific measures were analyzed for multiple building types. About 200 of these measures are found in the residential sector, 800 are non-residential measures.

Q. Please explain why the DEER database, a California database of energy efficiency measures, is applicable to Illinois.

A. While the DEER database is a database constructed and maintained in California, many of the measures have equal applicability to any jurisdiction. The database contains two basic types of measures. First, there are weather-sensitive measures. These are measures for which savings impacts are sensitive to local weather conditions. While we used the DEER database as a source for basic weather-sensitive measure definitions, we developed independent estimates of measure savings based on weather conditions characteristic of the Ameren Illinois Utilities' service territory. Second, there are non-weather-sensitive measures – measures for which energy savings are largely independent of weather. Industrial motors and many lighting measures are examples. In this case,

measure savings from California are just as good as those from any other location, provided the methods for determining unit savings are valid and robust. In that respect the DEER database is preferred, as it is based on many years of program impact evaluations, continually reviewed by developers and users, and updated frequently.

Q. Did your list of measures include all possible energy efficiency measures?

A. No. Even though our initial list included close to 1,000 measures, the list of all possible measures would be several times as large. A list of all possible measures would require that we look at every device or system that uses electricity in every possible building type, with every possible heating and cooling system. It is standard practice when conducting a first-stage measure screening to restrict analysis to those measures within a set of common building types that could account for the majority of energy efficiency potential in a given area. The goal of the measure screening process is to create the building blocks for energy efficiency programs. These programs should be designed such that if additional measures are considered important to include, they can easily be screened and included within the program without major redesign. I consider the list of measures examined to have been comprehensive.

2. Analysis of Cost-effectiveness of Measures

Q. How did you determine which energy efficiency measures should be included within the Ameren Illinois Utilities' energy efficiency portfolio?

A. The Act requires that the energy efficiency measures used in the portfolio be "cost-effective," which is defined as having satisfied the Illinois TRC test. The standard TRC test was originally developed by the California Energy Commission in the 1980s as part of what is called the California Standard Practice Manual. Virtually every jurisdiction

uses some form of this test for energy efficiency analysis. Illinois defines the TRC test as follows:

“Total resource cost test” or “TRC test” means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.

Section 1-70 of P.A. 94-0481 (Illinois Power Agency Act).

Q. Please summarize the Illinois TRC test in your own words.

A. In basic terms, the TRC test compares the benefits realized by installing a measure with the costs to install that measure. Benefits are calculated as the product of the measure’s estimated energy and peak demand savings and the utilities avoided cost. Costs are equal to the incremental capital, installation and operating and maintenance (O&M) costs. The incremental cost is defined as the difference between the cost of the efficiency measure and the cost of the measure that otherwise would have been installed. To illustrate this last concept, consider the following situation. A consumer has decided that her existing refrigerator no longer functions properly and that a new refrigerator is needed. She has a number of options for the new refrigerator, including a basic model that meets federal energy efficiency standards and a more expensive model that is more energy efficient.

221 The incremental cost is the difference between the basic refrigerator and the higher
222 efficiency model. In some cases, this incremental cost is actually the full cost of a
223 measure. This would be the case, for example, when a consumer adds insulation to an
224 attic, or when a commercial customer retrofits an existing set of lighting fixtures with
225 more efficient fixtures. In the case of the commercial customer, “retrofit” means that the
226 equipment is being replaced while it is still functional. Since the equipment would not
227 otherwise require replacement, we count the full cost of the replacement technology in
228 the calculation.

229 In order to apply the TRC test to the individual energy efficiency measures we
230 identified, we first had to gather additional data and perform further analyses related to
231 these measures.

232 **Q. Please explain your additional data collection efforts and analyses.**

233 A. First, we divided the measures that we examined into two major classes: those with
234 energy and peak demand savings that are not affected by temperature and those for which
235 savings are weather-dependent. The former class includes measures such as lighting,
236 household appliances, motors, and many industrial processes. The latter class includes
237 measures such as air conditioning and building shell improvements (insulation). For
238 example, an air conditioner will run for more hours and consume more electricity over
239 the course of a summer in Carbondale than it will in Chicago, because the Carbondale
240 summers are generally warmer. An air conditioning efficiency measure will, therefore,
241 save more energy when it is applied in Carbondale as opposed to Chicago.

242 The savings and cost data associated with non-weather-sensitive measures were
243 taken in most cases from the DEER database. These measure data are frequently updated

and are consistent in terms of cost basis. In several cases, we supplanted DEER measure cost with more recent local data. The costs for compact fluorescent light bulbs in the residential sector were based on data collected by the Midwest Energy Efficiency Alliance as part of last year's Change-a-Light campaign.

In the case of weather-sensitive measures, we developed independent estimates of measure savings using building energy simulation. We employed the DOE-2 model, the industry standard for simulating the hour-by-hour energy use of a building and its component systems. Separate estimates of measure savings for a wide range of measures were developed by simulating the operation of nine prototypical commercial building types and four prototypical residential homes. The home types were single family with gas heat and central air conditioning, single family with electric resistance heat and central air conditioning, single family with an electric air source heat pump, and multi-family with gas heat. These simulations were prepared using normal weather data characteristic of Central and Southern Illinois. Several heating, ventilation and air conditioning (HVAC) types were also modeled for the commercial building types. The building and HVAC types that were modeled are presented below:

Table 1: Building & HVAC Types Used in DOE-2 Model

Building Type	HVAC Types
Education	Chiller & Boiler; Pkg AC & Gas Furnace
Health Inpatient	Chiller & Boiler; Pkg AC & Gas Furnace
Lodging	Chiller & Boiler; Pkg AC & Gas Furnace
Retail	Chiller & Boiler; Pkg AC & Gas Furnace
Office - Large	Chiller & Boiler
Food Sales	Pkg AC & Gas Furnace
Food Service	Pkg AC & Gas Furnace
Office - Small	Pkg AC & Gas Furnace
Warehouse	Pkg AC & Gas Furnace

262 Second, in addition to collecting energy and demand savings data for the
263 measures, the analysis requires estimates of the useful life of each measure. Measure
264 lifetime is needed because the TRC test analysis needs to account for all of the energy
265 savings realized by implementation of a measure over time. For example, installing a
266 compact fluorescent light bulb generates savings relative to an incandescent bulb for a
267 number of years, depending on how many hours a year the bulb is used. Third, the cost-
268 effectiveness analysis requires a discount rate that is used to estimate the present value of
269 the efficiency measure's costs and benefits.

270 **Q. How did you calculate the energy savings value(s) under the TRC test?**

271 A. In order to properly value energy savings, we developed an appropriate hourly
272 disaggregation of measure energy savings. A utility's avoided costs typically can vary by
273 hour and will be significantly higher during certain times of the year and hours than
274 others. If we were to use a simple average annual value for the Companies' avoided
275 costs in our calculation of the benefits of the energy efficiency measure, we would
276 underestimate the value of savings during high-cost hours of the year and overestimate
277 the value during low-cost hours.

278 The avoided energy and capacity costs that we used for the analysis were
279 provided to us by the Companies. These costs were provided to us as hourly values for a
280 twenty-year period. Avoided capacity costs were provided as annual values per kilowatt
281 for the forecast horizon. Mr. Voytas provides a more complete description of the avoided
282 cost forecasts. The forecast provided to us includes a value for carbon. We aggregated
283 these hourly values into 36 bins (peak, off-peak and weekends/holidays) for each month
284 to simplify the calculations. Using normalized hourly load curves for non-weather-

285 sensitive measures, we decomposed estimates of annual energy savings into hourly
286 values and then re-aggregated the savings into the same 36 bins. The normalized energy
287 savings per period were multiplied by the 36 period costs to yield an annual avoided
288 energy cost for a specific measure. In the case of the weather-sensitive measures, the
289 DOE-2 model provides hourly estimates of energy savings. These were normalized and
290 aggregated into the same 36 costing periods, so that the same calculation of avoided
291 energy costs could be performed.

292 **Q. Please describe how you applied the TRC test to the individual measures.**

293 A. Using the data described above, we calculated the value of the TRC test for each of the
294 measures in the database. The product of estimated annual energy savings for each
295 measure and the present value of the annual avoided costs were divided by the
296 incremental cost of each measure. Measures with a ratio of benefits to costs of 1.0 or
297 greater were considered to pass the TRC test. In general terms, the TRC test compares
298 benefits (avoided costs times energy and demand savings) and costs (incremental capital,
299 installation and O&M costs of measures + utility implementation and administrative
300 costs). The formal expression of the Illinois TRC test, which differs from the standard
301 formulation of the TRC test described above, is as follows:

302 TRC = Benefits/Costs

303
$$BTRC = \sum_{t=1}^N \frac{UAC_t}{(1+d)^{t-1}}$$

304
$$CTRC = \sum_{t=1}^N \frac{PRC_t + PCN_t + UIC_t}{(1+d)^{t-1}}$$

305 Where:

306 BTRC = Benefits of the program

307 CTRC = Costs of the program

308 UAC_t = Utility avoided supply costs in year t

309 UIC_t = Utility increased supply costs in year t

310 PRC_t = Program Administrator (Utility) program costs in year t

311 PCN = Net Participant Costs

312 The TRC test often is applied to assess the cost effectiveness of individual energy
313 efficiency measures as well as energy efficiency programs. When the analysis of
314 measures is prepared, we look at a single measure's costs and benefits and do not include
315 variables such as Program Administrator Costs, since at this stage in the analysis, there
316 are no program costs.

317 **Q. Does your calculation of cost-effectiveness incorporate both electricity savings and**
318 **demand reductions?**

319 A. Yes, this is very important. Most energy efficiency measures reduce the total amount of
320 electricity consumed over the course of a year, but also reduce peak demand. Some
321 measures, like a central air conditioner tune-up, have a greater impact on peak demand
322 than installation of a residential CFL, since the CFL most likely is not on during the

summer peak period. When we calculate the cost-effectiveness of a measure, we multiply energy savings by the avoided energy cost and estimated coincident peak demand savings by avoided capacity costs. These costs are time-differentiated to ensure that we capture the proper value of energy and peak demand reductions over the course of a year, since avoided costs can vary substantially by time of day and time of year.

Q. How does the Illinois version of the TRC test differ from standard formulations of the test?

A. There are several differences. First, the standard formulation (the version included in the California Standard Practice Manual) includes the value of tax credits in calculating the benefits of an efficiency measure. Second, and most important, the standard formulation includes the value of all energy savings attributable to a measure, while the Illinois version includes only the value of electricity savings and excludes natural gas savings.

Q. Is this latter difference significant?

A. Yes. The importance can best be explained using an example. Some energy efficiency measures produce both electricity and natural gas savings. For example, adding insulation to a house will reduce both the electricity used for cooling and the natural gas or electricity used for heating. Similarly, insulating a home's ductwork or sealing duct leaks saves both gas and electricity. The Illinois TRC test, at least as it has been interpreted, excludes gas savings, which can be significant in a northern climate like that of the Companies' service area. Measures such as those described above are assessed strictly on the basis of their electricity savings, and it is often the case that these savings alone will not exceed the cost of the measure. As a result, the measures do not screen as cost-effective, and the number of measures that can be included in programs is limited.

Q. Please describe the results of the TRC test on the individual energy efficiency measures.

A. The results of the measure screening are presented in tables 2 and 3 below. Of the roughly 1,000 measures that were screened, approximately 580, or 64 percent passed with a benefit-cost ratio of 1.0 or greater. Table 2 shows the numbers of measures passing the TRC test for each sector, as well as illustrates the number of any additional measures that would pass the TRC test if natural gas savings were included. Table 3 describes the measure types that passed the Illinois TRC test. A measure type encompasses a number of specific measure configurations. For example, the commercial T8 lighting measure includes a variety of light fixture configurations within the 8 commercial building types that were included in the analysis. These measures are subsequently bundled into program “types.”

Table 2. Number of Measures Passing the TRC Test

	Total # of Measures	# Passing Illinois TRC	# Passing with Gas Included
Residential	222	107	120
Non-Residential	732	476	478
Totals	954	583	598

Table 3. Types of Measures Passing the TRC Test

Residential Measures	Commercial Measures	Industrial Measures
Compact Fluorescent Lamps (*screw-ins and pin-based)	T12 to T8 linear fluorescent lamps (various combinations)	Compressed Air Improvements (controls, optimization, VSD installations)
T12 to T8 linear fluorescent lamps (various combinations)	Compact Fluorescent Lamps (screw-ins)	Fan improvements
LED Exit Signs	HID lighting upgrades	Pump Improvements
Electroluminescent Exit Signs	LED Exit Signs	Process Heating
2nd refrigerator pick-up and	Electroluminescent Exit Signs	

recycling	LED Traffic and Pedestrian Signals	Refrigeration
Central AC Refrigerant Charge	Computer Power Management	Machine Drive
Domestic Hot Water Wrap	Variable Speed Drives and Temperature Control for Chilled Water and Hot Water Loops	HVAC
Hot Water Pipe Insulation	Air Handler Coil Cleaning	T12 to T8 linear fluorescent lamps (various combinations)
Low-Flow Showerheads	Air Handler Scheduling	Compact Fluorescent Lamps (screw-ins)
Increased Duct Size	New Packaged Air Conditioning Units	HID lighting upgrades
Reduced Duct Leakage	Variable Air Volume Retrofits	Process Controls
Correct Central AC Sizing	Commercial Refrigeration Controls and Equipment Upgrades	Various Sector-Specific Process Improvements
14-SEER Central AC	Occupancy Sensors	
Ceiling Insulation	Vending Machine Controls	
Wall Insulation	Efficient Street Lighting	
Reduced Infiltration	New Construction	
ENERGY STAR Dishwasher	Standard T8 to Super T8 linear fluorescent lamps	
Faucet Aerators		
ENERGY STAR Window AC		
Ground Source Heat Pump		
ENERGY STAR Ceiling Fan		
ENERGY STAR De-humidifier		
ENERGY STAR Freezer		
High-Efficiency Water Heater		
Home Demand Response		

B. Development of Energy Efficiency Programs

1. Bundling of Measures into Programs

Q. Please explain the process of bundling measures into program types.

A. A program type is a general classification that references the types of measures that might be offered within a program targeted at a specific market. For example, we might bundle all residential lighting and appliance measures passing the TRC test into a lighting and appliances program. The program types that we use for this process are based on an ongoing review of program design and implementation. The bundling process is used because very few, if any, programs are designed and implemented that include only one

single measure. Rather, program designers build programs around combinations of measures that might appeal to a given market and that can be delivered using similar channels. The bundling process also is necessary because in subsequent steps, we estimate how many of each measure would or could be adopted by program participants and then sum the energy and demand reduction impacts of these measures.

Appendix B to the Companies' Plan includes a set of tables showing each measure and the program type to which it was assigned. Note that not all measures assigned to a program ultimately were included in the program, because not all were cost-effective.

Q. Please describe "best practice" program design and implementation.

A. Energy efficiency program "best practice" involves the application of a number of considerations, as well as experience, to each individual case. Considering the degree to which regulatory environments differ from state to state, there simply is too much variability across objectives, regulatory structures and program types to enable simple, broad conclusions about what is best in every case. Best practices should be viewed partly as a function of the experience of the program administrator and implementer. For example, best practices for a utility that has been designing and managing programs for two decades may be different from best practices for an organization just entering the field.

Various organizations have, however, reviewed and compiled best practices in the area of energy efficiency. My reference to an ongoing review of best practice design and implementation refers to my review of a number of well-respected assessments of program best practice such as ACEEE's compendium of Exemplary Programs, and

393 reviews of program best practice sponsored by the California Public Utilities
394 Commission and the Energy Trust of Oregon. It also is based on a review of the types of
395 programs implemented by utilities often considered to be leaders in the field, such as
396 Xcel energy, Northeast Utilities, Pacific Gas & Electric ("PG&E") and the Wisconsin
397 Focus on Energy program. Finally, the Companies solicited the input of national experts
398 in this area during a meeting of Illinois stakeholders in Lombard on September 13, 2007.
399 Based on my review of these sources and my experience in working with a number of
400 utilities, best practice design generally includes the following considerations:

401 1. Programs should focus on technologies/market segments with relatively
402 large untapped potential. Program designs that offer prescriptive rebates for common
403 technologies across the entire C&I market are relatively simple to design and administer,
404 and are very effective in tapping into large veins of efficiency potential in lighting,
405 motors and HVAC systems.

406 2. Programs should leverage existing branding and delivery structures. For
407 example, residential lighting, appliance, and new homes programs built around the
408 ENERGY STAR brand can leverage the market awareness the brand enjoys.

409 3. Programs should employ simple, straightforward program design. The
410 more complex the design, the more difficult the implementation and administration of the
411 program, and the greater the level of organizational capacity required to manage the
412 program. For example, prescriptive rebate programs that employ deemed savings values
413 and standard rebate amounts for common technologies are basic building blocks of
414 virtually every utility program portfolio. Resource acquisition programs tend to be more
415 straightforward and resource-efficient than market transformation programs.

416 4. Incentives should be targeted at the point in the product value chain that
417 yields the greatest leverage. For example, aiming the Ameren Illinois Utilities'
418 incentives at large appliance retailers or manufacturers and having those entities provide
419 the incentives to consumers would enable the Companies to achieve greater scale faster
420 and minimizes the resources the Companies would have to deploy. Similarly, using
421 residential HVAC distributors as the delivery vehicle for an air conditioning incentive
422 program takes advantage of the distributors' existing networks and natural incentives to
423 "sell up."

424 5. Large customers can be most effectively tapped with custom incentive
425 programs. These programs provide rebates for groups of measures based on calculated
426 savings and have proved to be very effective at generating low cost (to the utility)
427 savings. These programs also provide utility customer account managers with valuable
428 tools for enhancing customer value. The design of these programs is straightforward,
429 with the utility providing an incentive threshold that customer can design projects
430 against.

431 6. Effective programs require close coordination of marketing, technical
432 support and incentives. For most companies, this requires an effective internal structure
433 for working across multiple organizations within the firm.

434 7. Effective portfolios represent a mix of education/consumer outreach,
435 technical support and training, and incentive elements, each of which is structured to
436 work with the others.

437 8. With the commoditization of many types of program services, it is
438 possible for a utility to develop and manage effective programs with significantly fewer

internal resources than was the case a decade ago. It is possible and cost-effective to outsource most program implementation services.

9. When working with upstream market participants such as national retailers or manufacturers, programs will be more effective if they employ structures with which these market participants are familiar. For example, if a retailer is used to working with a point-of-sale rebate, it will be most efficient to design a new program around this preference.

10. While there are exceptions, the most important of which is noted below, best practice programs have staying power. They become best practice because their sponsors have time to refine both design and implementation. Participation rates climb as program availability becomes known through market networks, and all points in the market chain have time to align with the program.

11. Finally, my point above notwithstanding, best practice, both in program design and in implementation, looks forward. Even though the immediate focus of a portfolio might be on achieving certain near-term targets, success ultimately is in transforming the market such that consumers make efficient decisions without direct financial incentives. Therefore, best practice requires us to look ahead to identify opportunities to move out of some program markets and into others to ensure program resources are efficiently allocated.

2. Program Design

Q. Please explain the process of how programs are built.

A. Program designers transform the general program types described in Appendix B to the Plan into a more detailed program design and then assemble the data needed to assess program cost-effectiveness. The more detailed program design is based on a conceptual

463 model of a program that describes how a particular method of delivering the measures,
464 including proposed incentives, recruiting, marketing and implementation strategies, will
465 motivate customers to acquire, install and use the efficiency measures.

466 For example, consider a residential lighting program. A program design in this
467 area would reflect the designers' understanding, based on their own and others'
468 experience and available market research, of the specific combination of incentives,
469 delivery mechanisms and marketing that will encourage customers to install compact
470 fluorescent bulbs. There are very different ways to accomplish this result, each of which
471 has a different cost and likelihood of success. For example, the Ameren Illinois Utilities
472 could directly install the bulbs. This would insure that the bulbs are in fact installed, but
473 at a significant cost per bulb. At the other extreme, the Ameren Illinois Utilities could
474 work with CFL manufacturers to provide discounts on CFLs that are flowed through to
475 the retail price. This "upstream" incentive is used in combination with cooperative
476 advertising with retailers to encourage consumers to purchase the bulbs at the discounted
477 price and screw them in themselves.

478 This model of program design informs the estimates of key program level data.
479 These data include the level of incentive per measure, the level of implementation,
480 marketing and administrative costs per program, and the estimated level of program
481 participation (the number of each measure that we expect to be installed). In most cases,
482 the sources of these data are other utility programs that have a structure similar to the
483 prospective program we are analyzing. As part of the analysis for the Ameren Illinois
484 Utilities, we collected data from either the plans or reported results for programs offered
485 by PG&E, Southern California Edison, Northeast Utilities (Connecticut Light and Power

and United Illuminating), NSTAR, Efficiency Vermont, We Energies, Xcel energy, Arizona Public Service, Nevada Power, NYSERDA, PacifiCorp and the New Jersey Utilities. We reviewed data for multiple programs from a number of these program administrators. This process notwithstanding, the program designs at this stage are still tentative; incentive levels are broadly defined, the list of eligible measures is based on a general screening process, and the details of program implementation have only be broadly sketched. Detailed program design and implementation planning typically occurs once programs are approved. At the point, the Companies would work with implementation contractors to develop much more detailed plans that include specific incentive levels and eligible measure lists.

3. Analysis of Cost-Effectiveness of Programs

Q. How did you determine whether a program was itself cost-effective?

A. To determine cost-effectiveness at a program level, we reran the TRC test on the programs, rather than on the measures. There are three differences between the screening process for measures and programs. First, the PRC term in the cost equations set forth is set to zero when screening measures. However, program-level screening requires that the PRC term take a value equal to the sum of the cost to implement and administer the program.

Second, while the measure screening focused on the cost-effectiveness of a single measure, by definition we are interested here in the cost-effectiveness of a bundle of measures as these measures are adopted by program participants. This means that at the program level, we must also project the number of measures that we expect to be adopted as a result of the program.

509 The third difference is directly related to the second. Every customer that
510 receives an incentive for undertaking a specific program-sponsored activity is a
511 participant, but not every participant is motivated to undertake that activity by the
512 program. Some fraction of program participants will be what is termed “free-riders” —
513 participants that would have undertaken the desired action even in the absence of the
514 program. The estimated savings for a program must be reduced by the amount of savings
515 attributed to these free riders. At the same time, however, there will be customers who
516 undertake the action the program is attempting to motivate based on the program’s
517 influence, but who do not actually take any incentive from the program. These customers
518 are known as “free drivers” and the savings that their actions produce are termed
519 “spillover”. Just as the effects of free riders must be accounted for, so should the effects
520 of free drivers.

521 The net effect of free ridership and spillover is known as the net-to-gross ratio —
522 the ratio of: (1) net program savings calculated as the net of free-ridership and spillover
523 and (2) gross program savings, which are equal to the total number of measures installed
524 and their associated savings. The net-to-gross ratio is a number calculated based on post-
525 implementation evaluation of program impacts. Using a series of questions posed to both
526 program participants and program non-participants, evaluators attempt to determine
527 which participants are free riders (i.e., would have undertaken a program-sponsored
528 action even without the program) and which non-participants are free drivers (i.e., took
529 action even though they did not avail themselves of the program incentives). Program
530 designers use the results of prior net-to-gross analyses as inputs to program cost-
531 effectiveness calculations.

532 The program cost data that were used in the analysis are based on the costs
533 reported by utilities running similar programs in other parts of the country. These costs
534 are reported in a variety of documents, including compendia of best practices, utility
535 planning documents and evaluation reports. We did not use these cost data directly, but
536 rather calculated relative cost measures such as implementation cost per unit of energy
537 saved so that we could apply data from different sized utilities to the Ameren Illinois
538 Utilities. In my response to an earlier question, I listed the utilities and other program
539 administrators that were the sources of program data. The values used in the Ameren
540 Illinois Utilities' portfolio ultimately were based on professional judgment, taking into
541 account the experience of other utilities, the Ameren Illinois Utilities' service territory
542 and the Companies' level of experience related to specific programs.

543 The participation data also are based on the actual or projected achievements of
544 similar programs as prepared by the utilities managing the programs. Again, the final
545 values used to develop the portfolio are based on the collective review of these data by
546 ICF and the Ameren Illinois Utilities' staff and the application of judgment. For key
547 program elements, such as the Residential Lighting Program element, we calculated the
548 number of compact fluorescent light bulbs that would need to be acquired given our
549 participation assumptions and compared this number with what other utilities has been
550 able to achieve, generally adjusting for the size of the utilities. We also generally
551 compared results to those we were seeing with the Commonwealth Edison Company
552 analysis. For programs that we expected would play a smaller role in the portfolio
553 initially, the participation assumptions were largely judgment-based, where the judgment
554 was informed by ICF and the Ameren Illinois Utilities' understanding of the relative size

555 of the market for a given program. In many cases, the Companies did not have recent or
556 detailed data describing the composition of the service territory (for example, the number
557 of T12 linear fluorescent fixtures currently installed in commercial space). Participation
558 rates were set to reflect our collective judgment as to levels of participation that could be
559 achieved given the design of the programs and the fact that the programs were starting
560 essentially from scratch. Participation was adjusted downward in several cases because,
561 based on our analysis of program and portfolio risk, we concluded that the success of the
562 portfolio was too dependent on the performance of a program. In other cases,
563 participation was boosted to reflect the Ameren Illinois Utilities' desire to acquire a
564 larger share of savings from more comprehensive programs such as building retro-
565 commissioning and custom incentives for business. Lacking data on the size of specific
566 program element markets and focused on designing a portfolio that would meet savings
567 goals, a primary concern on our part was avoiding over-estimates of program
568 participation. The estimates of participation that we have used should be viewed not as
569 targets or caps for any given program element, but as conservative estimates of market
570 response.

571 The principal source of the net-to-gross estimates was the California Energy
572 Efficiency Policy Manual as referenced in the DEER online database. This manual
573 contains a table of reference net-to-gross ratios.¹ This source contains tables of reference
574 net-to-gross ratios.

575 **Q. Please summarize the findings of your cost-effectiveness analysis.**

576 **A.** Table 4 shows the results of the program cost-effectiveness analysis:

¹ Available at <http://eega.cpuc.ca.gov/deer/Ntg.asp>

577 **Table 4: TRC Results for the Ameren Illinois Utilities and DCEO Programs**

Program Name	TRC	Notes
Home Energy Performance	1.76	
Residential HVAC Diagnostics & Tune-Up	1.07	
Residential Appliance Recycling	1.15	
Residential Lighting & Appliances	1.68	
Residential Multifamily	1.48	
Commercial Demand Credit	2.50	
Residential DR - Direct Load Control	1.73	
C&I Prescriptive	1.37	
C&I Retro-commissioning	1.40	
Commercial New Construction	1.12	
Street Lighting	1.93	
C&I Custom	1.90	
DCEO Public Sector Prescriptive	1.62	
DCEO Public Sector Customized Program	3.04	
DCEO Public Retro-commissioning	4.47	
DCEO Lights for Learning	2.74	
DCEO Low Income New Const. Gut Rehab	0.59	
DCEO Low Income EE Moderate Rehab (MF)	0.50	
DCEO Single Family Rehab	0.32	
DCEO Low Income Direct Install	0.63	
DCEO Smart Energy Design Assistance Program	0.00	No Savings
DCEO Manufacturing Energy Efficiency Program	0.00	No Savings
DCEO Building Industry Training & Education	0.00	No Savings
DCEO Public Sector New Construction	4.52	

578

579 **C. Design of Energy Efficiency Portfolio**

580

581 **1. Constructing a Portfolio from Programs**

582 **Q. Please describe how the Ameren Illinois Utilities' energy efficiency portfolio was**
 583 **designed.**

584 A. Drawing from those programs that passed the TRC test, we worked with the Companies
585 to build a portfolio that was designed to achieve the goals set forth in the statute subject
586 to the spend cap. In addition, we took into account other important considerations, such
587 as how fast certain programs can be ramped up, and the risk profiles of the programs (i.e.,
588 the likelihood that actual savings will match expected savings).

589 **Q. Can you describe the portfolio design process in more detail?**

590 A. The portfolio design step actually uses three distinct approaches to increase the likelihood
591 of achieving the savings goals. First, given the constraints noted above, we simulated a
592 variety of different combinations of programs, start dates, ramp-up rates and participation
593 rates to arrive at a phased combination of programs that would maximize savings under
594 the statutory spend cap, but that also would yield program diversity, ensure that programs
595 were available for all customer classes, and position the portfolio for the second
596 planning/implementation cycle.

597 Second, we bundled what are described above as programs into several broad
598 “solutions” offerings. We believe that best practice design requires that we view the
599 program offerings from the perspective of the customer. If customers are faced with the
600 variety of individual programs we described above, we require them to sort out which
601 program will offer them the solutions they seek. This can easily lead to customer
602 confusion and lower participation. In addition, by operating a dozen programs as though
603 they were independent is inefficient, leading to overlapping marketing, recruiting and
604 delivery efforts. Finally, the separate implementation of all of these programs inevitably
605 will lead to missed opportunities to provide customers solutions that cut across multiple
606 program elements. Therefore, we have worked with the Companies to bundle these

individual programs as elements within two broad solutions programs – Residential Solutions and Business Solutions. Although, these solutions-based programs will involve multiple incentive types and services, the intent is to market the programs as the equivalent of super-stores, with several easy-to-find portals that will provide access to a full range of services. For analysis purposes it was necessary to treat these elements separately so that we could estimate measure costs and savings. However, as the Plan indicates, the portfolio will “go-to-market” as two broad programs.

Third, we added a final layer of costs to represent cross-cutting portfolio administrative requirements such as incremental labor, evaluation and planning, as well as vital program elements that do not directly yield energy savings. These program elements include consumer information and education tools and initiatives, and technical assistance and training that would not otherwise fall under a specific energy-saving program.

2. Analysis of Cost-Effectiveness of Portfolio

Q. After you designed the energy efficiency portfolio, did you test the cost-effectiveness of the portfolio as a whole?

A. Yes. Once the portfolio composition was fixed and portfolio-wide costs were added, we again calculated the value of the TRC test.

Q. What were the results of the test of portfolio cost-effectiveness?

A. The portfolio as a whole, including the DCEO programs has an estimated total resource cost test benefit-cost ratio of 1.40.

III. ANALYSIS OF COST-EFFECTIVENESS OF OTHER ELEMENTS OF THE AMEREN ILLINOIS UTILITIES' PLAN

A. Demand Response Portfolio

632 **Q. Did you also assess the cost-effectiveness of demand response programs for the**
633 **Companies?**

634 A. Yes. We prepared an analysis of two programs. One was a Residential Central Air
635 Conditioner Direct Load Control Program and the other was a Small Commercial
636 Demand Credit (voluntary curtailment) Program.

637 **Q. What were the results of the analysis?**

638 A. The Residential AC load control program has an estimated TRC benefit-cost ratio of
639 1.73. The Commercial Demand Credit program has an estimated benefit-cost ratio of
640 2.5.

641 **B. DCEO Portfolio**

642 **Q. Did you also analyze the cost-effectiveness of the programs proposed by the**
643 **Department of Commerce and Economic Opportunity?**

644 A. Yes. The department provided all program data required for the cost-effectiveness
645 analysis. We processed these data such that the program cost-effectiveness could be
646 calculated using the same process as was used for the Companies' programs. Although
647 we discussed certain assumptions with DCEO, we did not assist with program design or
648 data collection.

649 **Q. Are these results of that analysis included in the plan filed by the Companies?**

650 A. Yes they are. Table 4 above includes the results of the TRC screening for the DCEO
651 programs.

IV. ENERGY EFFICIENCY PORTFOLIO'S ABILITY TO ACHIEVE STATUTORY GOALS

Q. In your opinion, is the Ameren Illinois Utilities' energy efficiency portfolio, in conjunction with DCEO's portfolio, designed to achieve the savings goals in Section 12-103(b) of the Public Utilities Act?

A. Yes. The explicit objective of the analysis process was to design a portfolio that would meet the savings goals, and the portfolio proposed by the Companies inclusive of the DCEO programs does meet the savings targets. However, we recognize that there are a number of uncertainties that characterize the analysis. For example, if specific measures do not save as much energy as we expect, if program participation is not what we estimate, or if the net-to-gross ratios chosen by the independent evaluator vary from those that we have used in our analysis, the verified net savings estimated by the evaluator could be different than our estimate.

Because of this uncertainty, we performed a risk analysis of the portfolio. The statute prescribes both hard energy efficiency savings goals and penalties for failing to meet those goals. The Ameren Illinois Utilities therefore need a portfolio that is sufficiently robust and flexible that they can meet their goals even if one or more programs do not deliver as expected. To determine how to create this robustness, we needed to examine how overall portfolio performance would be affected by program- and measure-specific performance that did not match expectations. In addition, identifying key portfolio uncertainties allows the Companies to target their efforts going forward more efficiently by focusing on improving the design of the programs that contribute the most to portfolio risk, and by designing away from the risk; that is, focusing on those programs for which we have greater confidence in key assumptions. There always will

676 be a trade-off, however, between minimizing risk and minimizing cost. As is often the
677 case, the least expensive options often carry the greatest risk. Thus, designing away from
678 the risk very often imposes a cost on the portfolio.

679 The risk analysis involved establishing probability distributions around the four
680 variables in the portfolio that represent program performance. These variables include:
681 (1) measure energy savings, (2) projected measure installations, (3) net-to-gross ratios
682 and (4) the engineering verification factor. Measure energy savings is the difference in
683 annual energy consumption between the baseline and efficient technologies. Projected
684 measure installations is the count of measures the program expects to install. The net-to-
685 gross ratio ("NTGR") in the model is defined as one minus the free-ridership rate plus the
686 spillover rate, where spillover is the fraction of program savings attributable to customers
687 who were influenced by but did not formally participate in a program. The engineering
688 verification factor is the ratio of evaluated verified installations to gross tracking
689 installations. The estimated energy use reduction for a measure is the product of these
690 four variables.

691 We set probability distributions around each of these four variables for each
692 program and ran a Monte Carlo simulation of the portfolio to see what effect these
693 uncertainties would have given the structure of the portfolio. A Monte Carlo simulation
694 is actually a large number of portfolio simulations, each of which includes different
695 values of the variables around which distributions were set. The results allow us to
696 calculate the probability that the portfolio will meet its target given program performance
697 uncertainty and to identify the uncertainties that contribute the most to portfolio risk.

698 **Q. Please describe the results of the Monte Carlo analysis.**

699 A. The results of this simulation showed that uncertainties contributing the greatest amount
700 to portfolio risk are the NTGR for CFLs the residential and commercial sectors.
701 However, this is not surprising for several reasons. First, CFLs constitute a large portion
702 of KWH savings in the Ameren Illinois Utilities' portfolio, as they do in many portfolios
703 around the country. Second, it is very difficult to predict the value that an evaluator will
704 assign to the program NTGR based on *ex post* analysis. Using NTGR from similar
705 programs around the country is a reasonable approach and one that is consistently used.
706 Presumably, the independent evaluators will estimate NTGR for the Companies'
707 programs, although given the low evaluation budget and the high cost of developing
708 NTGR estimates, it is unclear if the evaluator will develop such program-specific
709 estimates or not. There is a correlation between the precision of NTGR and the evaluation
710 budget; less precision means more uncertainty.

711 **Q. Does the risk you have described materially affect your view of whether the Plan is**
712 **designed to meet the statutory targets?**

713 A. No. Although CFL NTGR uncertainty contributes the most to the Companies' portfolio
714 risk of all of the variables examined in the risk analysis, this particular risk can be and has
715 been mitigated to some extent. Under any reasonable set of circumstances, the
716 Companies must be able to realize substantial energy savings from the CFLs incented
717 through its programs if it is to achieve its targets, as there are no other measures that can
718 reach significant market share so rapidly and inexpensively. However, the Companies
719 have three options for managing the risk. The first is to ensure that programs that include
720 CFLs are appropriately designed to reduce the likelihood of free-ridership. The Ameren
721 Illinois Utilities have done this by emphasizing designs that require participants to pay

some fraction of the cost of the bulbs or take some affirmative action to receive the bulbs.

Second, the Companies can plan to move a greater number of CFLs through their program than they otherwise would, such that the net savings from the CFLs (after accounting for the NTGR) are sufficient to enable the Companies to meet their targets. The Companies have done this, although the number of CFLs envisioned by the plan is well within the range of what other utilities have accomplished. Finally, the Companies can accelerate (as much as is prudent) the introduction of other programs and measures that are not as susceptible to the NTGR uncertainty. The Companies have done this by planning to accelerate the level of activity under its proposed retro-commissioning and custom incentive program elements. In addition to these three options, assurance that the independent evaluator will calculate the NTGR as the defined above, that is, including both free ridership and spillover, substantially reduces risk since those two factors tend to offset one-another.

V. THE USE OF DEEMED VALUES FOR CERTAIN VARIABLES

Q. Please define the term “deemed values” as it is sometimes used in the context of energy efficiency analysis.

A. “Deemed values” means simply that the values of certain variables used in an analysis of program impact have been agreed to by parties or set by a public utilities commission. Put another way, to “deem” a value means that parties have agreed, or a commission has found, that there is sufficient existing information regarding the value of a variable that the value can be accepted as the basis for both planning purposes and evaluation.

Q. Are you recommending that any values used in your analysis be deemed?

744 A. Yes. I recommend that the Commission, by accepting the values used in our analysis,
745 deem certain net-to-gross ratios and measure savings values for the implementation of the
746 programs. These values would then be used by the independent evaluator when
747 calculating the actual savings associated with certain programs.

748 **Q. Why is it appropriate to deem certain values for purposes of evaluation in this**
749 **proceeding?**

750 A. There are multiple reasons. First, the Act limits the budget that can be allocated to
751 evaluation of utilities' energy efficiency and demand response measure to 3 percent of
752 portfolio resources. This budget is at the lower end of current standards in the industry,
753 and is in fact one of the lowest allocations that I have seen. For example, the California
754 utilities that will constitute the Illinois utilities' peer group will be spending closer to
755 eight percent of their total budgets on evaluation. This low allocation effectively means
756 that an evaluator will not be able to conduct the level of analysis required to
757 independently determine the savings values for the close to 583 measures included in the
758 Ameren Illinois Utilities' programs, as well as calculate net-to-gross-ratios for all
759 programs including both free rider and spillover effects using program data from the
760 Companies.

761 Deeming savings is a common approach in the evaluation community given the
762 substantial experience with the savings associated with basic non-weather sensitive
763 measures such as lighting. For example, large sums of money have been spent in
764 California to independently determine deemed savings for measures, which values are
765 then published in DEER. Some of the basic lighting measures in DEER are also included
766 in the Ameren Illinois Utilities' portfolio, and are therefore appropriate to deem for the

767 portfolio. Indeed, if these values are not deemed, the Companies' evaluator will, with a
768 very limited budget, be replicating well-established and widely relied upon savings
769 research. In other words, the evaluator would be spending money verifying numbers that
770 most of the evaluation community already accepts despite having less money available
771 than other jurisdictions for such activities. And, spending evaluation money on deeming
772 measure savings will mean the evaluator will have less money to spend on other critical
773 evaluation activities, such as conducting new net-to-gross studies with the level of rigor
774 needed to instill confidence in these estimates.

775 Second, the fact that there likely will not be sufficient resources to independently
776 establish measure savings and net-to-gross values creates risk for the Ameren Illinois
777 Utilities that is difficult to mitigate or manage. While I believe that the values we have
778 used for key variables are well-established and documented, there is no way to know how
779 an as-yet unknown evaluator will choose to pursue the evaluation and what values the
780 evaluator might come up with for these variables. Therefore, the Companies could do an
781 outstanding job of designing and implementing programs, yet still have an evaluator find
782 that they did not reach their savings targets by virtue of having used a different value than
783 the evaluator used for a certain key variable. Deeming certain values up front can
784 provide much needed certainty to all parties.

785 **Q. How do you propose the Commission use these values?**

786 A. Because of the reasons outlined above, the Commission should deem the proposed
787 measure savings and net-to-gross values for the initial, pre-evaluation period of the
788 Companies' three-year energy efficiency and demand response plan. If the independent
789 evaluator later finds that one or more of the deemed values is inappropriate and provides

evidence to support that assertion, the values certainly should be adjusted. However, if the deemed values change, they should be applied on a going-forward basis only. Retroactive application of new values would introduce additional uncertainty and risk to the process.

If the Commission chooses not to deem the proposed values, I recommend that the Commission direct that, upon award of a contract, the independent evaluator, working with the Companies and stakeholders, shall review the values the Ameren Illinois Utilities have used in their analysis and determine their appropriateness. If the evaluator finds any values to be inaccurate, the Companies would adjust their estimates of savings accordingly. After making any such adjustments, these values shall be used going forward for determining energy savings until such time as the evaluator may develop revised values. Those revised values shall be applied on a prospective basis for purposes of determining savings for measures installed after that point. Retroactive application of revised values would introduce additional uncertainty and risk to the process.²

Q. What measure values do you recommend be deemed?

A. I recommend the deemed savings values in Table 6 below for measures in the residential and small retail markets. These are basic lighting measures critical to the portfolio's success. This list really includes only five technologies, with variations on wattage and target market for CFLs, and wattage and length for T8s. Table 5 shows the basic technologies.

² A potential fourth option could bifurcate measures savings and net-to-gross ratios, and recommend that the Commission deem the former and not the latter.

Table 6: Proposed Technologies

Technology
Integral CFL
Modular CFL
Super T8 lamps with electronic ballast
T8 32 lamps with electronic ballast
T8 lamps with electronic ballast and reflector

Table 7: Proposed Deemed Annual kWh Savings Values

Target market	Base Technology	Efficient Technology	Efficient Technology Definition	Annual kWh savings
All Residential	40W Incandescent	13 Watt Integral CFL	13 Watt < 800 Lumens - screw-in	23.1
All Residential	60W Incandescent	13 Watt Integral CFL	13 Watt >=800 Lumens - screw-in	40.1
All Residential	60W Incandescent	14 Watt Integral CFL	14 Watt - screw-in	39.3
All Residential	60W Incandescent	15 Watt Integral CFL	15 Watt - screw-in	38.4
All Residential	60W Incandescent	16 Watt Integral CFL	16 Watt - screw-in	37.6
All Residential	60W Incandescent	18 Watt Integral CFL	18 Watt < 1,100 Lumens - screw-in	35.9
All Residential	75W Incandescent	18 Watt Integral CFL	18 Watt >=1,100 Lumens - screw-in	48.7
All Residential	75W Incandescent	19 Watt Integral CFL	19 Watt >=1,100 Lumens - screw-in	47.8
All Residential	75W Incandescent	20 Watt Integral CFL	20 Watt - screw-in	47.0
All Residential	100W Incandescent	23 Watt Integral CFL	23 Watt - screw-in	65.8
All Residential	75W Incandescent	25 Watt Integral CFL	25 Watt <1,600 Lumens - screw-in	42.7
All Residential	100W Incandescent	25 Watt Integral CFL	25 Watt >=1,600 Lumens - screw-in	64.1
All Residential	75W Incandescent	26 Watt Integral CFL	26 Watt <1,600 Lumens - screw-in	41.9
All Residential	100W Incandescent	26 Watt Integral CFL	26 Watt >=1,600 Lumens - screw-in	63.2
All Residential	100W Incandescent	28 Watt Integral CFL	28 Watt - screw-in	61.5
All Residential	100W Incandescent	30 Watt Integral CFL	30 Watt - screw-in	59.8
All Residential	150W Incandescent	36 Watt Integral CFL	36 Watt - screw-in	97.4
All Residential	150W Incandescent	40 Watt Integral CFL	40 Watt - screw-in	94.0
Multi-family	75W Incandescent	18 Watt Integral CFL	18 Watt >=1,100 Lumens - screw-in	48.7
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	1 4' T8 32 watt lamps with electronic ballast & reflector	1 4' T8 32 watt lamps	173.3
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	1 8' T8 59 watt lamps with electronic ballast & reflector	1 8' T8 59 watt lamps	244.4
Retail - Small	40W Incandescent	13 Watt Modular CFL	13 Watt < 800 Lumens - pin based	100.5
Retail - Small	40W Incandescent	13 Watt Integral CFL	13 Watt < 800 Lumens - screw-in	100.5
Retail - Small	60W Incandescent	13 Watt Modular CFL	13 Watt >=800 Lumens - pin based	175.0
Retail - Small	60W Incandescent	13 Watt Integral CFL	13 Watt >=800 Lumens - screw-in	175.0
Retail - Small	60W Incandescent	14 Watt Modular CFL	14 Watt - pin based	171.3
Retail - Small	60W Incandescent	14 Watt Integral CFL	14 Watt - screw-in	171.3
Retail - Small	60W Incandescent	15 Watt Modular CFL	15 Watt - pin based	167.6
Retail - Small	60W Incandescent	15 Watt Integral CFL	15 Watt - screw-in	167.6
Retail - Small	60W Incandescent	16 Watt Modular CFL	16 Watt - pin based	163.9
Retail - Small	60W Incandescent	16 Watt Integral CFL	16 Watt - screw-in	163.9
Retail - Small	60W Incandescent	18 Watt Modular CFL	18 Watt < 1,100 Lumens - pin based	156.4
Retail - Small	60W Incandescent	18 Watt Integral CFL	18 Watt < 1,100 Lumens - screw-in	156.4

Retail - Small	75W Incandescent	18 Watt Modular CFL	18 Watt $\geq 1,100$ Lumens - pin based	212.3
Retail - Small	75W Incandescent	18 Watt Integral CFL	18 Watt $\geq 1,100$ Lumens - screw-in	212.3
Retail - Small	75W Incandescent	19 Watt Modular CFL	19 Watt $\geq 1,100$ Lumens - pin based	208.5
Retail - Small	75W Incandescent	19 Watt Integral CFL	19 Watt $\geq 1,100$ Lumens - screw-in	208.5
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	2 4' Super T8 28 watt lamps with electronic ballast	2 4' Super T8 28 watt lamps	151.1
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	2 4' T8 32 watt lamps with electronic ballast	2 4' T8 32 watt lamps	302.7
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	2 8' Super T8 59 watt lamps with electronic ballast	2 8' Super T8 59 watt lamps	48.9
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	2 8' T8 59 watt lamps with electronic ballast	2 8' T8 59 watt lamps	159.1
Retail - Small	75W Incandescent	20 Watt Modular CFL	20 Watt - pin based	204.8
Retail - Small	75W Incandescent	20 Watt Integral CFL	20 Watt - screw-in	204.8
Retail - Small	100W Incandescent	23 Watt Modular CFL	23 Watt - pin based	286.7
Retail - Small	100W Incandescent	23 Watt Integral CFL	23 Watt - screw-in	286.7
Retail - Small	75W Incandescent	25 Watt Modular CFL	25 Watt $< 1,600$ Lumens - pin based	186.2
Retail - Small	75W Incandescent	25 Watt Integral CFL	25 Watt $< 1,600$ Lumens - screw-in	186.2
Retail - Small	100W Incandescent	25 Watt Modular CFL	25 Watt $\geq 1,600$ Lumens - pin based	279.3
Retail - Small	100W Incandescent	25 Watt Integral CFL	25 Watt $\geq 1,600$ Lumens - screw-in	279.3
Retail - Small	75W Incandescent	26 Watt Modular CFL	26 Watt $< 1,600$ Lumens - pin based	182.5
Retail - Small	75W Incandescent	26 Watt Integral CFL	26 Watt $< 1,600$ Lumens - screw-in	182.5
Retail - Small	100W Incandescent	26 Watt Modular CFL	26 Watt $\geq 1,600$ Lumens - pin based	275.6
Retail - Small	100W Incandescent	26 Watt Integral CFL	26 Watt $\geq 1,600$ Lumens - screw-in	275.6
Retail - Small	100W Incandescent	28 Watt Modular CFL	28 Watt - pin based	268.1
Retail - Small	100W Incandescent	28 Watt Integral CFL	28 Watt - screw-in	268.1
Retail - Small	120W Incandescent	30 Watt Modular CFL	30 Watt - pin based	335.2
Retail - Small	100W Incandescent	30 Watt Integral CFL	30 Watt - screw-in	260.7
Retail - Small	150W Incandescent	36 Watt Integral CFL	36 Watt - screw-in	424.5
Retail - Small	120W Incandescent	40 Watt Modular CFL	40 Watt - pin based	297.9
Retail - Small	150W Incandescent	40 Watt Integral CFL	40 Watt - screw-in	409.6
Retail - Small	200W Incandescent	55 Watt Modular CFL	55 Watt - pin based	540.0
Retail - Small	200W Incandescent	65 Watt Modular CFL	65 Watt - pin based	502.7

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Target market	Base Technology	Efficient Technology	Efficient Technology Definition	Annual kWh savings
All Residential	40W Incandescent	13 Watt Integral CFL	13 Watt < 800 Lumens - screw-in	23.1
All Residential	60W Incandescent	13 Watt Integral CFL	13 Watt ≥ 800 Lumens - screw-in	40.1
All Residential	60W Incandescent	14 Watt Integral CFL	14 Watt - screw-in	39.3
All Residential	60W Incandescent	15 Watt Integral CFL	15 Watt - screw-in	38.4
All Residential	60W Incandescent	16 Watt Integral CFL	16 Watt - screw-in	37.6
All Residential	60W Incandescent	18 Watt Integral CFL	18 Watt $< 1,100$ Lumens - screw-in	35.9
All Residential	75W Incandescent	18 Watt Integral CFL	18 Watt $\geq 1,100$ Lumens - screw-in	48.7
All Residential	75W Incandescent	19 Watt Integral CFL	19 Watt $\geq 1,100$ Lumens - screw-in	47.8
All Residential	75W Incandescent	20 Watt Integral CFL	20 Watt - screw-in	47.0
All Residential	100W Incandescent	23 Watt Integral CFL	23 Watt - screw-in	65.8
All Residential	75W Incandescent	25 Watt Integral CFL	25 Watt $< 1,600$ Lumens - screw-in	42.7
All Residential	100W Incandescent	25 Watt Integral CFL	25 Watt $\geq 1,600$ Lumens - screw-in	64.1

All Residential	75W Incandescent	26 Watt Integral CFL	26 Watt <1,600 Lumens - screw-in	41.9
All Residential	100W Incandescent	26 Watt Integral CFL	26 Watt >=1,600 Lumens - screw-in	63.2
All Residential	100W Incandescent	28 Watt Integral CFL	28 Watt - screw-in	61.5
All Residential	100W Incandescent	30 Watt Integral CFL	30 Watt - screw-in	59.8
All Residential	150W Incandescent	36 Watt Integral CFL	36 Watt - screw-in	97.4
All Residential	150W Incandescent	40 Watt Integral CFL	40 Watt - screw-in	94.0
Multi-family	75W Incandescent	18 Watt Integral CFL	18 Watt >=1,100 Lumens - screw-in	48.7
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	1 4' T8 32 watt lamps with electronic ballast & reflector	1 4' T8 32 watt lamps	173.3
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	1 8' T8 59 watt lamps with electronic ballast & reflector	1 8' T8 59 watt lamps	244.4
Retail - Small	40W Incandescent	13 Watt Modular CFL	13 Watt < 800 Lumens - pin based	100.5
Retail - Small	40W Incandescent	13 Watt Integral CFL	13 Watt < 800 Lumens - screw-in	100.5
Retail - Small	60W Incandescent	13 Watt Modular CFL	13 Watt >=800 Lumens - pin based	175.0
Retail - Small	60W Incandescent	13 Watt Integral CFL	13 Watt >=800 Lumens - screw-in	175.0
Retail - Small	60W Incandescent	14 Watt Modular CFL	14 Watt - pin based	171.3
Retail - Small	60W Incandescent	14 Watt Integral CFL	14 Watt - screw-in	171.3
Retail - Small	60W Incandescent	15 Watt Modular CFL	15 Watt - pin based	167.6
Retail - Small	60W Incandescent	15 Watt Integral CFL	15 Watt - screw-in	167.6
Retail - Small	60W Incandescent	16 Watt Modular CFL	16 Watt - pin based	163.9
Retail - Small	60W Incandescent	16 Watt Integral CFL	16 Watt - screw-in	163.9
Retail - Small	60W Incandescent	18 Watt Modular CFL	18 Watt < 1,100 Lumens - pin based	156.4
Retail - Small	60W Incandescent	18 Watt Integral CFL	18 Watt < 1,100 Lumens - screw-in	156.4
Retail - Small	75W Incandescent	18 Watt Modular CFL	18 Watt >=1,100 Lumens - pin based	212.3
Retail - Small	75W Incandescent	18 Watt Integral CFL	18 Watt >=1,100 Lumens - screw-in	212.3
Retail - Small	75W Incandescent	19 Watt Modular CFL	19 Watt >=1,100 Lumens - pin based	208.5
Retail - Small	75W Incandescent	19 Watt Integral CFL	19 Watt >=1,100 Lumens - screw-in	208.5
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	2 4' Super T8 28 watt lamps with electronic ballast	2 4' Super T8 28 watt lamps	151.1
Retail - Small	2 4' T12 34 watt lamps with magnetic ballast	2 4' T8 32 watt lamps with electronic ballast	2 4' T8 32 watt lamps	302.7
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	2 8' Super T8 59 watt lamps with electronic ballast	2 8' Super T8 59 watt lamps	48.9
Retail - Small	2 8' T12 60 watt lamps with magnetic ballast	2 8' T8 59 watt lamps with electronic ballast	2 8' T8 59 watt lamps	159.1
Retail - Small	75W Incandescent	20 Watt Modular CFL	20 Watt - pin based	204.8
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Retail - Small	100W Incandescent	23 Watt Modular CFL	23 Watt - pin based	286.7
Retail - Small	100W Incandescent	23 Watt Integral CFL	23 Watt - screw-in	286.7
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Retail - Small	75W Incandescent	25 Watt Integral CFL	25 Watt <1,600 Lumens - screw-in	186.2
Retail - Small	100W Incandescent	25 Watt Modular CFL	25 Watt >=1,600 Lumens - pin based	279.3
Retail - Small	100W Incandescent	25 Watt Integral CFL	25 Watt >=1,600 Lumens - screw-in	279.3
Retail - Small	75W Incandescent	26 Watt Modular CFL	26 Watt <1,600 Lumens - pin based	182.5
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Retail - Small	100W Incandescent	28 Watt Modular CFL	28 Watt - pin based	268.1
Retail - Small	100W Incandescent	28 Watt Integral CFL	28 Watt - screw-in	268.1
Retail - Small	120W Incandescent	30 Watt Modular CFL	30 Watt - pin based	335.2

Retail - Small	100W Incandescent	30 Watt Integral CFL	30 Watt - screw-in	260.7
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Retail - Small	150W Incandescent	40 Watt Integral CFL	40 Watt - screw-in	409.6
Retail - Small	200W Incandescent	55 Watt Modular CFL	55 Watt - pin based	540.0
Retail - Small	200W Incandescent	65 Watt Modular CFL	65 Watt - pin based	502.7

The savings values above are based on a simple calculation that multiplies the difference in wattage between the assumed base technology and the efficient technology and the number of hours of operation. The operating hours used in the calculation are shown in Table 7

Table 7: Operating Hours

Sector	Technology	Subsector	Annual Operating Hours
Non residential	Lighting	Small	3,724
Residential	CFL lighting	Residential	854

Q. What net-to-gross ratio do you proposed to be deemed?

A. I recommend deeming the net-to-gross ratios set forth in Table 8 below. I want to emphasize, however, that the net-to-gross ratios presented below are taken from several California sources. Although the current standard procedure in California is to define net-to-gross only in terms of free ridership levels, I am recommending that the net-to-gross ratio be defined more appropriately as the sum of free rider and spillover effects. As I explained earlier, the effect of including spillover effects in a net-to-gross calculation is to raise the ratio – spillover represents savings attributable to the program for which the program did not have to pay. Therefore, the values that I propose the Commission deem are in fact conservative estimates of net-to-gross ratios that incorporate both free riders and spillover.

Table 9: Proposed Deemed Net-to-Gross Ratios

Program	Net-to-Gross Ratio	Source
Home Energy Performance	0.8	CA Energy Efficiency Policy Manual
Residential AC Diagnostics & Tune-up	0.8	CA Energy Efficiency Policy Manual
Residential Appliance Recycling	0.35	CA Energy Efficiency Policy Manual ³
Residential Lighting & Appliances	0.8	CA Energy Efficiency Policy Manual
Residential Multifamily	0.8	CA Energy Efficiency Policy Manual
Residential New HVAC	0.8	CA Energy Efficiency Policy Manual
Residential Central AC Load Control	NA	
Commercial Demand Credit	NA	
C&I Prescriptive	0.8	CA Energy Efficiency Policy Manual
C&I Retro-commissioning	0.8	CA Energy Efficiency Policy Manual
C&I Custom	0.8	CA Energy Efficiency Policy Manual
C&I New Construction	0.8	CA Energy Efficiency Policy Manual
DCEO Public Sector Prescriptive	0.8	CA Energy Efficiency Policy Manual

³ Substantial effort has gone into the determination of net-to-gross ratios for California's refrigerator recycling program; in-part because estimation of these ratios is more complex due to the nature of the program and the secondary market for used refrigerators. For example, it can be difficult to distinguish between the pick-up of a unit that has been used as a second refrigerator and one that has been recently replaced as a primary refrigerator. The value we propose is the lowest value found in several studies reviewed in California.

DCEO Public Sector Customized Program	0.8	CA Energy Efficiency Policy Manual
DCEO Public Retro-commissioning	0.8	CA Energy Efficiency Policy Manual
DCEO Lights for Learning	0.8	CA Energy Efficiency Policy Manual
DCEO Low Income New Const. Gut Rehab	0.8	CA Energy Efficiency Policy Manual
DCEO Low Income EE Moderate Rehab (MF)	0.8	CA Energy Efficiency Policy Manual
DCEO Single Family Rehab	0.8	CA Energy Efficiency Policy Manual
DCEO Low Income Direct Install	0.8	CA Energy Efficiency Policy Manual
DCEO Smart Energy Design Assistance Program	0.8	CA Energy Efficiency Policy Manual
DCEO Manufacturing Energy Efficiency Program	0.8	CA Energy Efficiency Policy Manual
DCEO Building Industry Training & Education	0.8	CA Energy Efficiency Policy Manual
DCEO Beyond Code K-12 Implementation Assistance	0.8	CA Energy Efficiency Policy Manual

830 **Q. What are the sources of the measures and net-to-gross deemed values?**

831 A. The source of energy savings and operating hours values is DEER, which has been
832 designated by the CPUC as its source for deemed and impact costs for program planning.

833 The primary source of net-to-gross ratios is the California Energy Efficiency
834 Policy Manual, which suggests a default NTGR of 0.8 for all proposed programs, with
835 the exception of refrigerator and freezer recycling programs.

836 VI. **COMPLIANCE WITH RATE IMPACT SCREEN AND SPEND CAP**

837 Q. Does the Ameren Illinois Utilities' proposed Plan portfolio comply with the Act's
838 rate impact screen and spend cap?

839 A. Yes. The Companies provided ICF with estimates of the maximum amount that could be
840 spent per year, consistent with the rate cap. The sum of the costs that we have estimated
841 for the Companies' programs, the costs that DCEO estimates for its programs, and
842 portfolio-wide costs for portfolio administration, evaluation and information, awareness
843 and education programs is less than this maximum amount (in each year of the plan).

844 VII. **DIVERSITY OF THE AMEREN ILLINOIS UTILITIES' ENERGY EFFICIENCY**
845 **AND DEMAND RESPONSE PLAN**

846 Q. Please describe the diversity of the programs in the Ameren Illinois Utilities' plan.

847 A. First, the Ameren Illinois Utilities' portfolio includes both the programs developed by the
848 Companies as well as those developed by the DCEO. The programs developed by DCEO
849 have been fully integrated into the Companies' portfolio and they contribute significantly
850 to diversify by their focus on low income, municipal and educational sectors. The
851 programs included in the portfolio address most key end uses. Within the residential
852 sector, the programs address residential lighting, second refrigerators, new central and
853 room air conditioners, air infiltration, central air conditioner charge and airflow, common
854 area lighting in multi-family buildings, and advanced lighting packages in new homes.
855 Within the commercial sector, the programs incorporate measures addressing lighting,
856 motors, air conditioning, building operations, commercial food service equipment, office
857 equipment and ventilation. The wide diversity of industrial end use and measures is
858 addressed by the custom incentive program, which is designed to include all measures
859 that can be found on a project basis to be cost-effective. The programs within the

860 portfolio are designed to evolve and incorporate additional measures over time. In
861 addition, the programs are diverse across sectors and market segments. The programs
862 address residential customers living in existing single-family and multi-family homes, as
863 well as low-income customers through programs offered by the DCEO for customers in
864 existing renovated and new homes. The portfolio also includes programs targeted at
865 residential and commercial new construction. The programs also address all commercial,
866 industrial, institutional and governmental customers.

867 **Q. Please describe the various customers for which energy efficiency and demand**
868 **response programs are made available.**

869 A. As I explained above, the portfolio has wide coverage of sectors and market segments.
870 Programs are designed for low-income residential customers, municipal customers, large
871 and small commercial customers, renters, homeowners, industrial facilities, and existing
872 and new construction markets.

873 **Q. Does this conclude your Direct Testimony?**

874 A. Yes.

Val R. Jensen
Senior Vice President
60 Broadway
San Francisco, CA 94111
(415) 677-7113
vjensen@icfconsulting.com

ICF Consulting

EDUCATION

M.A. Public Affairs (Energy Policy and Quantitative Methods), Humphrey Institute, University of Minnesota, Minneapolis, Minnesota, 1981

B.A., Summa cum Laude, Phi Beta Kappa, Political Science, Hamline University, St. Paul, Minnesota, 1978

EXPERIENCE OVERVIEW

Mr. Jensen, a Senior Vice President with ICF, manages the firm's San Francisco office. He has over 25 years of experience with utility resource planning, energy efficiency and renewable energy program, design, utility restructuring, and market transformation for local, state and federal agencies, and electric and gas utilities. Mr. Jensen managed Illinois' statewide electric and natural gas integrated resource planning program, directing all technical and economic analyses, and providing testimony before the Illinois Commerce Commission. He has advised major electric and natural gas utilities on the development of energy efficiency programs and resource plans, and worked with the U.S. Environmental Protection Agency on the analysis of a variety of energy efficiency technologies and potential markets. For the U.S. Department of Energy, he managed the Competitive Resource Strategies Program, and coordinated utility restructuring-related research and policy for the Office of Energy Efficiency and Renewable Energy. He also served as a senior member of the staff of the Assistant Secretary for Energy Efficiency, and managed the Department of Energy's Chicago Regional Office. Recent projects have included management of energy efficiency potential studies in Wisconsin, Ontario, and Georgia, development of DSM plans for utilities in Illinois, Wisconsin and Missouri, preparation of multiple DSM program filings for a Nevada utility, an assessment of potential utility DSM business and regulatory models, and development and management of a number of energy efficiency programs.

PROJECT EXPERIENCE

Strategy and Regulatory Support

Support for California's Energy Efficiency Strategic Planning Process

In October 2007 the California Public Utility Commission (CPUC) initiated a statewide energy efficiency strategic planning process focused on investor-owned utility pursuit of several "Big Bold" strategies. Mr. Jensen was asked to provide support to the CPUC in the overall coordination of the process, and to lead investigation of strategies for integrating energy efficiency, demand-response and renewable energy technologies.

Development of a New Business Strategy for an Electricity Retailer

Mr. Jensen designed and led an assessment of potential new business opportunities for an unregulated electricity retailer interested in expanding its demand-side market presence. Over two dozen potential business opportunities were investigated and detailed business cases were prepared for five specific opportunities.

Utility Energy Efficiency Benchmarking

For E.ON (Louisville Gas & Electric and Kentucky Utilities) Mr. Jensen led an assessment of the utility's existing DSM portfolio using ICF's energy efficiency portfolio development framework. The team reviewed the structure and performance of the existing portfolio and developed a set of benchmark programs meeting the Company's portfolio objectives.

Development of DSM Planning Process

For a major utility in Missouri, Mr. Jensen is leading a team to develop a DSM planning process within an IRP framework. The engagement also entails development of DSM portfolios for inclusion in the IRP and facilitation of a stakeholder workshop process.

Strategic Support for DSM Portfolio Development

Mr. Jensen is providing strategy support senior executives at a major Midwestern utility for the development of a demand-side portfolio for implementation within a restructured environment. Support includes portfolio review, regulatory strategy, and assistance with design of an administrative/business structure.

Assessment of Energy Efficiency Business Models

Mr. Jensen led a project for a major Midwestern utility to identify and assess a range of potential business and regulatory models for administration of energy efficiency programs. The client was interested in exploring the role of energy efficiency in a post-restructuring market in several states. ICF developed six potential models and assessed the viability of the models relative to regulatory policy, company risks and benefits, benefits to customers and likely stakeholder reaction.

Residential Energy Service Offering

For Unicom, Mr. Jensen led a team to assess a unique residential energy service offering that would have provided energy service at a fixed monthly charge. Under this model, the unregulated provider would have provided energy, and energy efficiency services including demand response technology. In return for agreement allowing the provider to provide energy management services, the customer would be charged a fixed monthly fee. ICF provided detailed building energy simulations for the Chicago market and assessed the risks associated with the product, including demand and weather risk. Ultimately, the lack of a liquid market for weather hedges at the time made the project infeasible.

Development of a Gas DSM Portfolio

As a response to expected skyrocketing natural gas costs over the winter of 2005-06, a Midwestern utility requested that ICF develop a quick-start natural gas DSM portfolio. Mr. Jensen's team was given approximately three weeks to prepare basic programs designs for five programs, including preliminary estimates of market penetration and program savings. The \$6 million portfolio was approved by the State's regulatory commission and launched in December 2005.

Development of a Green Power Business Plan

Mr. Jensen worked as part of a team to develop a business plan for a utility affiliates planned entry into the green power products market. Tasks included development of a consumer acquisition strategy and a marketing plan.

Development of Utility Energy Efficiency Plan

Mr. Jensen led an ICF Consulting team in the development of a plan for a major utility's re-entry the energy efficiency program administration. The assignment involves a baseline market characterization, development of a portfolio framework, preparation of program templates for the \$60 million initiative, and preparation of a program management plan.

DSM Program Filings

For Nevada Power and Sierra Pacific Resources, Mr. Jensen led an ICF team in the preparation of several regulatory filings to support DSM program implementation. This project included a review of individual program designs, assessment of the portfolio structure, and drafting the filings and supporting testimony.

Renewable Energy Portfolio Standard Compliance Plan

Mr. Jensen led preparation of a compliance plan for Nevada Power's compliance with Nevada's aggressive renewable portfolio standard that was filed with the Nevada Commission in December 2005. The plan addressed the Company's current and expected portfolio position, reviewed a wide range of internal and external factors affecting compliance and developed a series of strategies and actions for bring the Company into compliance. The project involved extensive collaboration with a number of organizations within the Company.

Wind Energy Solicitation

Mr. Jensen is leading an ICF team in the development of an RFP to acquire wind resources for a major Midwestern utility. In addition, ICF is being retained as the independent bid manager responsible for review of the bids received under the solicitation.

Gas DSM Testimony in Illinois

Mr. Jensen provided expert testimony in a natural gas rate proceeding regarding proposals for Nicor to develop and fund natural gas energy efficiency programs.

Estimates of Energy Efficiency Potential in Wisconsin

The State of Wisconsin requires utilities seeking to construct new generation to demonstrate that they have first considered all economic opportunities for energy efficiency to reduce the need for new capacity. In support of two utilities' proposals for new generating capacity, Mr. Jensen developed testimony pertaining to the amount of energy efficiency potential that could be expected in the utilities' service territories.

Energy Efficiency Potential in Georgia

Mr. Jensen led the development of estimates of energy efficiency potential for the State of Georgia. Using a detailed end use model developed by ICF for measuring energy efficiency potential, the team prepared estimates of electric and gas efficiency potential, estimating rate impacts that would be associated with adoption of energy efficiency programs, and assessing the ancillary economic and environmental impacts associated with energy efficiency acquisition.

Energy Efficiency Potential in Ontario

Mr. Jensen led a team that developed estimates of energy efficiency potential for the Ontario Power Authority. This project also involved application of a formal analysis of the uncertainties associated with potential estimates using Monte Carlo simulation.

Evaluation of the Energy Innovations Small Grants Program

Mr. Jensen served on a three-person senior review team to assess the operation and results of a program designed to provide first-stage R&D funding to small business and individuals. The team developed a framework for evaluating value-creation and value-capture in a program managed by the California Energy Commission to fund promising energy system R&D.

Illinois' Integrated Resource Planning Process

In the mid-1980s, Illinois enacted one of the country's most comprehensive integrated resource planning processes. Mr. Jensen organized and led a statewide collaborative responsible for developing administrative rules for implementation of the process. He led the team responsible for filing the first statewide electric and natural gas integrated plans, and was lead witness for the State agency responsible for the plans. He also filed testimony reviewing the integrated plans filed by Commonwealth Edison.

Florida Integrated Resource Planning

While with the US Department of Energy, Mr. Jensen drafted testimony on behalf of the Department with respect to IRP rules under consideration by the Florida PSC, and provided lead case support.

Energy Efficiency Program and Technology Analysis and Implementation

Design and Implementation of Small Commercial Energy Efficiency Program

For the City of San Francisco, Mr. Jensen led a team in the design and implementation of a program providing rebates for installation of energy efficiency measures under the City's Energy Watch Program, funded by PG&E. The team designed the program structure, all policies and procedures and provided implementation support including project verification and rebate processing.

Development and Implementation of a Consumer Rebate Program

Mr. Jensen led an ICF team in the development and implementation of program providing gift cards to consumers purchasing qualifying residential products. The ICF team was given less than two months to design the program, develop all collateral material, recruit participating retailers, organize retailer events and incentive fulfillment and launch the program.

Implementation Support for an Energy Efficiency Procurement Plan

Mr. Jensen is leading an ICF team in providing full-scale implementation support for a large Midwestern utility's energy efficiency portfolio. ICF is developing final program designs, drafting requests for proposals for implementation and evaluation contractors, helping to establish a program management "back office", and monitoring implementation progress.

Evaluation of the Statewide Appliance Early Retirement and Recycling Program

Mr. Jensen directed an impact evaluation of a recent statewide appliance retirement and recycling program. The evaluation included a meta-analysis of prior evaluation studies and analysis of on-site monitoring data.

Partnership for Energy Affordability in Multi-Family Housing

Mr. Jensen designed and is directing implementation of a \$1.8 million program to deliver comprehensive energy efficiency services to multi-family affordable housing in Northern California. The program was recently selected by the California Public Utilities Commission for a two-year, \$3 million extension.

Public Interest Energy Research Program – California Energy Commission

Mr. Jensen manages a team of 15 consulting firms providing technical assistance to the California Energy Commission in support of its PIER Program. Mr. Jensen is responsible for managing assignment of work authorizations, developing work plans, managing work performed and reporting to the CEC under this \$3 million contract.

Walnut Creek Energy Strategy – City of Walnut Creek, CA.

Mr. Jensen was responsible for managing a project to evaluate energy efficiency and distributed generation opportunities for the City of Walnut Creek. Under this project, ICF Consulting, surveyed over 15 municipal facilities and prepared analyses of the cost-effectiveness of a wide range of energy efficiency and renewable energy applications. The analysis identified several hundred dollars of cost-effective energy saving opportunities.

Residential HVAC Blitz – Pacific Gas & Electric

Mr. Jensen managed a project designed to encourage replacement of close to 1 MW worth of residential central air conditioning load in California's Central Valley within a 5-month window. ICF Consulting combined an innovative dealer up-selling training program with distributor and

dealer incentives and exceeded its program goals. At the same time, dealers were left with a valuable set of selling techniques that are being used to continue to sell high efficiency systems even without financial incentives.

The Feasibility of Community Energy Cooperatives – State of Illinois

With ICF Consulting as a subcontractor to the University of Illinois, Mr. Jensen designed and coordinated an analysis of the feasibility of community energy cooperatives as aggregators and providers of energy efficiency services. The analysis also examined the impacts of coop-sponsored distributed resources on the distribution loads of the local utility.

Cost-Effectiveness Analysis of Advanced Residential Space Conditioning Systems – US EPA

Mr. Jensen directed an assessment of the costs and benefits of adopting advanced residential space conditioning systems for U.S. EPA. As part of that analysis, Mr. Jensen developed a method for estimating the market potential for the technologies.

Fuel Substitution Analysis – Confidential Utility Client

Directed an analysis of the cost-effectiveness and market potential of residential and commercial fuel substitution measures and associated technologies for a utility client.

Demand-Side Management Potential – Confidential Utility Client

For a utility client, Mr. Jensen prepared an analysis of the technical, economic and achievable potential for demand-side management. The project involved collection of residential, commercial and industrial DSM technology data, the analysis of technology costs and benefits, and an estimate of market penetration.

Demand-Side Management Action Plan – Confidential Utility Client

Directed development of a comprehensive DSM action plan for a utility client, involving preparation of detailed program designs for specific residential, commercial and industrial sector technologies and identification of DSM technology needs.

Energy and Utility Resources Policy Analysis

Development of Estimates of Energy Efficiency Potential

For the past three years, Mr. Jensen has led a team in development of a complex model to estimate energy efficiency potential. The model is based on an end-use characterization of demand, and includes a comprehensive database of energy efficiency measures and an endogenous function for projecting the diffusion of energy efficiency measures. The model has been used for utilities or government organizations in Wisconsin, the Province of Ontario and the State of Georgia.

Understanding the Renewable Energy Technology Value-Chain – US DOE

Mr. Jensen managed an ICF Consulting-led analysis of how the technologies supported by DOE's Office of Power Technologies (OPT) moved from the lab to the marketplace, focusing on the key dynamics involved in the technology diffusion process. The analysis was prepared to support the OPT RD&D planning process.

Policy Plan for a Municipal Water Agency's Investment in Renewable Energy

Mr. Jensen led a team hired by East Bay Municipal Utility District, one of the largest water utilities in the country, to develop an investment strategy supporting renewable energy development for the District. The team developed a comprehensive list of investment options and structures, facilitated a stakeholder review process and developed a business case for preferred options.

The Economic Efficiency of Wholesale and Retail Competition – US DOE

Mr. Jensen developed a policy paper for review within the Department of Energy that examined the relative economic efficiency gains expected from wholesale power market competition. He

also coordinated a broader review of the tradeoffs between wholesale and retail electricity market competition.

The Public Policy Framework for Public Benefits – US DOE

As Director of the Department of Energy's Competitive Resource Strategies Programs, Mr. Jensen developed and coordinated a major collaborative project implemented by Oak Ridge National Laboratory to identify and assess a variety of policy objectives to support continued funding for a variety of public benefits programs.

Illinois Statewide Electric and Gas Utility Resource Planning

As Manager of the Illinois Department of Energy and Natural Resources Strategic Planning Section, Mr. Jensen helped develop Illinois' resource planning process for electric and natural gas utilities during the 1980s. He was responsible for development of biennial statewide electric and gas resource plans and for presenting those plans before the Illinois Commerce Commission.

Utility Restructuring, Market Transformation and Public Benefits

Financing Energy Efficiency in Assisted Multi-Family Housing – US DOE

The lack of financing for energy efficiency investment in multi-family housing and the split-incentive are oft-cited barriers to transforming this market. While with the US Department of Energy, Mr. Jensen developed a partnership with a state housing development authority to bring private financing through performance contracting to a market that previously had been neglected. Mr. Jensen's team provided training and technical and marketing assistance to the housing development authority, reviewed performance contracts and helped validate contractor-estimated energy savings. The project succeeded in bringing private financing to the upgrade of close to 1000 units of assisted housing, and demonstrated the viability of performance contracting in the multi-family market.

Transforming the Market for Modular Housing – US DOE

Mr. Jensen's team at the Department of Energy's Chicago Regional Office worked with modular housing manufacturers, state energy officials, and local housing developers to pull together a project resulting in the first Energy Star modular house in the Midwest. The team also developed a handbook for local housing developers interested in installing efficient modular homes, and began building a coalition of developers with an eye toward volume purchases of Energy Star-compliant modular designs.

The Midwest Energy Efficiency Alliance

While with the Department of Energy, Mr. Jensen organized and funded a project to explore the viability of Midwest Market Transformation network aimed at facilitating and coordinating multi-party energy efficiency market transformation projects. Based on the success of this project, he worked with utilities, State Energy Offices, and non-profit organizations to create the Midwest Energy Efficiency Alliance (MEEA) in late 1999, and served as a founding board member.

Financing Energy Efficiency in a Restructured Utility Environment – US DOE

Mr. Jensen designed and managed a project to examine the financing options available to the residential and small commercial markets for energy efficiency investments. The study's conclusion was that, absent at least interim support through public benefits programs, efficiency investment by small customers was likely to languish, in part because the efficiency industry had yet to fully develop to serve small customers.

Lessons Learned Regarding Public benefits and Utility Restructuring – US DOE

While Director of DOE's Chicago Regional Office, Mr. Jensen organized and moderated a daylong session involving public benefits experts from around the country to examine the lessons learned in securing public benefits funding as part of the restructuring process. The workshop

explored the policy rationale and policy objectives assigned to public benefits programs across the country.

The Feasibility of Small Customer Aggregation – US DOE

Mr. Jensen managed an analysis of the economics of aggregating small residential and commercial customers in response to restructuring. The analysis examined economics from the "buy" and "sell" sides for several scenarios including commodity-only, bundled commodity and energy service, and bundled electricity and gas, and green power commodity. The analysis strongly suggested that the high recruitment and administrative costs associated with aggregating small customers offered, at best, razor-thin margins on the sell side. It further suggested that for-profit aggregation was severely constrained by standard offer prices in many restructured states.

The Midwest Restructuring Summit: The Art of the Deal – US DOE

In 1998, Mr. Jensen, on behalf of the Department of Energy, organized the Midwest Restructuring Summit: The Art of the Deal. This two-day, invitation-only conference drew over 100 of the region's utility commissioners, legislators, utility executives, consumer groups, and energy office officials to Chicago to outline the pieces in the restructuring deal critical to the future of public benefits funding.

Energy Efficiency and Climate Change

Assessment of Climate Change Mitigation Methodologies – US EPA

For U.S. EPA, directed an assessment of a wide variety of models and methodologies for assessing climate change mitigation options, principally energy efficiency. Developed a methodology for developing countries to use in assessing mitigation options and organized an international seminar to review the methodology.

Analysis of Transformers for the Energy Star Program – US EPA

Led a project to analyze the potential energy and carbon savings associated with improved power transformer efficiency. Explored the economic, energy and environmental implications of a variety of possible Energy Star standards for transformers.

Energy Efficiency in China – US EPA

For the U.S. EPA, prepared a briefing paper on the institutional framework for energy efficiency in China, and the potential for that framework to support energy efficiency policies similar to those in the U.S.

SELECTED PUBLICATIONS AND PRESENTATIONS

"Cranking the Numbers: Using Tracking Systems to Strengthen Program Management", *Association of Energy Service Professionals Annual Conference*, January 31, 2007.

"Resource Diversity for Distribution Companies", short course delivered at "Camp NARUC", Institute of Public Utilities, August 2006.

Jensen, Val R, "Efficiency Plays Role of Adolescent in Future Electric Industry", *Natural Gas and Electricity*, May 2005.

"Energy Efficiency in the Future of Supply and Transmission: A Parable of Adolescence", *Presentation to the Institute of Public Utilities Regulatory Policy Conference*, Charleston, S.C., December 7, 2004.

Jensen, Val R, "Midwestern Renaissance: A Tale of Three States' Public Benefits Victories".
ACEEE Summer Study in Buildings, August 2000.

"Restructuring and Public Benefits" *Presentation to the Wisconsin Governor's Energy Roundtable*, Appleton, WI, November 1999.

Alexander, Larry; Hornby, Richard; Morgan, Steve, and Jensen, Val, "The Feasibility of Small Customer Aggregation", *ACEEE Summer Study in Buildings*, August 1998.

"The Progress of Electric Utility Restructuring", *Presentation to the Ice Skating Institute Annual Meeting*, Las Vegas, May 1998.

"Does Gas Integrated Resource Planning Still Make Sense?", *Presentation to the Colorado Public Utilities Commission Natural Gas Seminar*, Denver, CO, May 1993.

"Electricity Restructuring and the Role of State Energy Offices", *Presentation to the National Association of State Energy Officials Annual Meeting*, Jackson, WY, October 1995.

"The Role of Renewable Energy in a Restructured World", *Presentation to the 2nd Annual NARUC Renewable Energy Conference*, Madison, WI, May 1995.

"DSM Financing in the U.S", *Presentation to the 1992 Natural Gas Industry Forum: Integrated Planning-The Contribution of Natural Gas*, Gaz Metropolitan and Canadian Gas Association, Montreal, October 1992.

Jensen, Val R.; Jensen Ken; Wolfe, Steven, Karagocev, Robert; and Deem, Jack, "An Assessment of Selected Advanced Residential Space Conditioning Systems", Report for the Environmental Protection Agency, Barakat & Chamberlin, March 1992.

Jensen, Val, Kleemann, Susan, et.al., *Illinois Statewide Electric Utility Plan: Optioning Resources for the Future 1992-2012*, Illinois Department of Energy and Natural Resources, January 1991.

Jensen, Val, "Building the Strategic Context for Least-Cost Planning: The Illinois Experience", *Public Utilities Fortnightly*, March 28, 1990.

Jensen, Val and Wagener, Gregory, "Reforming Regulatory Reform", *Public Utilities Fortnightly*, July 12, 1986.

EMPLOYMENT HISTORY

ICF Consulting	Senior Vice President	2005 -
ICF Consulting	Vice President	2000-2004
U.S. Department of Energy	Director of Chicago Regional Office	1996-1999
U.S. Department of Energy	Senior Management Analyst	1994-1996
ICF Consulting	Project Manager	1992-1994
Barakat & Chamberlin	Senior Associate	1991-1992
Illinois Department of Energy	Manager of Strategic Planning	1980-1991